

PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

In re Application of

October 13, 2009

Cynthia Ebner et al.

:

Examiner: S.B. Haider

U.S. Serial No. 10/649,747

:

Art Unit: 1796

Filed: August 28, 2003

:

Docket No.D-43641-01

**For: OXYGEN SCAVENGER
BLOCK COPOLYMERS AND
COMPOSITIONS**

APPEAL BRIEF

Mail Stop Appeal Brief-Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

This Appeal Brief is filed pursuant to Appellants' Notice of Appeal mailed on June 17, 2009. Appellants have concurrently submitted a Request for Extension of Time for extending the deadline by two months for submitting the Brief, the payment of the applicable fees having been authorized in the Request.

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Statement of Real Party in Interest

The real party of interest in the above-identified patent application is Cryovac, Inc.

Statement of Related Cases

The Appellants are not aware of related prior or pending appeals, interferences, or judicial proceedings.

Jurisdictional Statement

The Board has jurisdiction of this Appeal under 35 USC 134(a). The Examiner mailed a Final Rejection on February 18, 2009, setting a three-month shortened statutory period for response. The period for responding to the final rejection expired on May 18, 2009 and a Letter of Response was filed within the period. An Advisory Action issued on June 15, 2009 and a Notice of Appeal was filed on June 17, 2009. The two month period of time for filing the Appeal Brief is being extended under Rule 136 by two months to October 17, 2009.

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Status of Amendments

An Amendment filed by Appellants on May 18, 2009 was entered by the Examiner pursuant to an Advisory Action mailed on June 15, 2009.

Grounds of Rejections to be Reviewed

The Final Rejection dated February 18, 2009 contains one (1) rejection of the claims. This rejection is made with respect to Claims 1-5, 7-13 and 15-16 under 35 USC 103(a) over the combined teachings of US Patent 6,458,437 to Ito et al., US Patent 4,485,228 to Chang et al., and US Patent 4,038,228 to Taylor.

The remaining claims of the subject application (Claims 6, 14 and 17-28) have been withdrawn from active consideration and are not subject to this appeal. They remain in the subject application for the Examiner's consideration to combine said remaining claims with claims presently under active consideration that are found in condition for allowance. Claims 6 and 14 are directed to subject matter not falling within the elected species made pursuant to Examiner's request to elect species to be examined. Further, Claims 17 to 28 are non-elected claims of a Restriction made under 35 USC 121 with respect to the original claims of the subject application.

Statement of Facts

The claims presently on appeal are directed to oxygen scavenging film and laminate products capable of removing oxygen from the interior atmosphere of packages formed therewith. Thus the products of the presently claimed invention aid in prolonging the useful life of an item to be protected (e.g. food products, beverages, such as wines and the like) within the package.

The presently claimed invention is directed to a film or a laminate product having at least one layer composed of oxygen scavenging composition consisting essentially of a catalytic amount of a transition metal and a block copolymer required to have blocks (long polymeric chain segments) formed from a first pre-polymer (P^A) and from a second pre-polymer (P^B). The pre-polymer (P^A) forming the first blocks is required to contain non-aromatic cycloalkenyl groups, be present in from 20 to 80 weight percent of the resulting block copolymer, have a T_g of lower than about minus 20°C and have functional groups that cause it to form linkages with prepolymer (P^B) which, in turn, have thermoplastic units; a T_m higher than +30°C and functional groups that have the ability to react with functional groups of (P^A).

The presently claimed block copolymer has been unexpectedly found to act as an oxygen scavenger agent under both ambient, room temperature conditions (ca. +20°C to +30°C) and refrigerated low temperature conditions (ca. < +20°C to -20°C) without imparting distracting color, taste and/or odor as well as exhibit a high degree of compatibility with conventional film forming polymers that may be used for other layers and to be readily processed to provide a desired tack-free, haze-free packaging product.

The sole rejection of the claims on appeal (Claims 1-5, 7-13 and 15-16) is made under 35 USC §103(a) over the combined teachings of Ito et al. (USP 6458437), Chang et al. (USP 4485228) and Taylor (USP 4038228).

The Examiner interprets (O.A. 2/18/09: Item 7) the claimed phrase “consisting essentially of” (See Claim 1, l. 2; Claim 9, l. 4) as equivalent to “comprising” in order to support the determination of applicability of the references’ teachings with respect to the claims here on appeal.

Ito et al. is directed to a heat shrinkable film required to be composed of certain *mixtures* of conventional polyesters resins with polyester elastomers (block copolymers) (Ito et al., Col. 1. 11-29 and Claim 2), each present in certain specific amounts with the polyester elastomers required to be the minor constituent of the formed composition (Ito et al. Co4. l. 28-31).

The Examiner admits that Ito et al. does not teach nor suggest the use of non-aromatic, cycloalkenyl group containing polymers, as required by the claimed invention here on appeal (O.A. 2/18/09; Item 4), no less any other material capable of acting as an oxygen scavenger (O.A. 2/18/09; Item 10). .

The Examiner proposes that Chang et al. teaching that aromatic terephthalic acid used by Ito et al. and the non-aromatic, alkenyl compound, tetrahydrophthalic acid, contained within the teachings of Chang et al. are functionally equivalent compounds (O.A. 2/18/09; Item 4) even though Ito et al. teach that aliphatic diacids, when present, should be limited to very low amounts of less than 3 mol percent (Ito et al. Col. 2, l. 37-43) and Chang et al.'s discussion of functionality relates to the formation of ester linkages and not to the organic group linking their functional groups (Chang et al. Col. 4, l. 18-21). Chang et al. merely teaches (Chang et al. Col. 4: l. 49-64) that their thermoset polyester is formed by "reacting an organic polycarboxylic acid or a functional equivalent thereof...with an organic polyol." Chang et al. broadly teaches that *all* organic di- and polycarboxylic compounds are useful to form their thermoset polyester.

Taylor directs one to the use of transition metal salts of highly unsaturated organic acids (Taylor Col. 3; l. 14-17) in large amounts to cause

post-use degradation of polymers (Taylor Col. 2; 1.13-33). The polymers of Taylor are not the same as those of the present invention.

The claims subject to this appeal are outlined herein below:

Claim 1, directed to films, and Claim 9, directed to laminates, recite that the product is a layered material having at least one layer composed of an oxygen-scavenger composition consisting essentially of a transition metal catalyst and a block copolymer having long block segments therein derived from:

A. at least one first pre-polymer (herein after "P^A") formed from:

- a) at least one substituted alicyclic compound providing mer units (groups within the resultant pre-polymer P^A) of cyclic, non-aromatic, alkenyl (ethylenic group containing hydrocarbon) groups, said compound further having functional groups capable of forming heteroatom covalent bond linkages; with
- b) at least one or a mixture of di- or polyfunctional hydrocarbon compounds wherein the functional groups are capable of forming heteroatom covalent bond linkages with the functional group of compound a) above.

B. at least one second pre-polymer (herein after “P^B”) formed from at least one mono- or difunctional polymer that is thermoplastic at elevated temperatures and has functional groups capable of forming heteroatom covalent bond linkages with the functional group of pre-polymer P^A above.

Claim 1 and Claim 9 further requires the pre-polymer P^A to have a glass transition temperature (T_g) of lower than minus 20°C and be present in from 20 to 80 weight percent of the final block copolymer and requires pre-polymer P^B to have a melt temperature (T_m) of higher than +30°C and be present in from 80 to 20 weight percent of the final block copolymer

Claim 2 and Claim 10 are each directed to specifically defined functional groups of compounds a) and b) forming pre-polymer P^A and the ratio of said groups.

Claim 3 and Claim 11 are each directed to specifically defined compound a) forming pre-polymer P^A.

Claim 4 and Claim 12 are each directed to specifically defined compound b) forming pre-polymer P^A.

Claim 5 and Claim 13 are each directed to specifically defined functional groups of pre-polymer P^B.

Claim 7 and Claim 15 are each directed to specifically defined polymeric unit of pre-polymer P^B.

Claim 8 and Claim 16 are each directed to a pre-polymer P^B selected from specifically defined lactones, carbonates, oxalates or lactam.

Argument

The presently claimed invention is directed to a film or a laminate product having at least one layer composed of oxygen scavenging composition consisting essentially of a catalytic amount of a transition metal and a block copolymer having therein blocks formed from a first pre-polymer (P^A) and from a second pre-polymer (P^B). The pre-polymer (P^A) forming one set of blocks of the subject block copolymer is required to contain non-aromatic cycloalkenyl groups, be present in from 20 to 80 weight percent of the resulting block copolymer, have a T_g of lower than about minus 20°C and have functional groups that cause it to form linkages with pre-polymer (P^B) which, in turn, must be composed of thermoplastic units; have a T_m higher than +30°C and have functional groups that have the ability to react with functional groups of (P^A).

The presently claimed block copolymer has been unexpectedly found to act as an oxygen scavenger agent under both ambient, room temperature conditions (ca. +20°C to +30°C) and refrigerated, low temperature conditions (ca. < +20°C to -20°C); to exhibit a high degree of compatibility with conventional film forming polymers used to form other layers of the claimed product; to provide a desired tack-free, haze-free packaging

product; and not contain or produce by-products during oxygen scavenging which detract from the taste, color or odor of the packaged material.

I.

Appellants submit that the Examiner has erred in rejecting Claims 1-5, 7-13 and 15-16 under 35 USC 103(a) over the combined teachings of USP6458437 (Ito et al.), USP 448522 (Chang et al.) and USP 4038228 (Taylor). The rejection should be reversed.

The Examiner has indicated that, in the review of the claims, the claimed phrase “consisting essentially of” (See Claim 1, l 2; Claim 9, l. 4) shall be read to be equivalent to “comprising”. Such is inconsistent with well established practice. Ex parte Davis 80 USPQ 448; In re Herz and Willis, 190 USPQ 461. The lack of merit of such reading will be discussed herein below.

The rejection here on appeal is based on Ito et al., which admittedly utilizes a block copolymer in a heat shrinkable, thermoplastic film composition. The resultant film is not composed of any component capable for oxygen scavenging; to have only minor amounts of their block copolymer in the resultant film; and is taught to have utility in a distinctly

different area of technology (to form labels on exterior of bottles). In an attempt to reconstruct the present invention, the Examiner, in a manner contrary to the teachings of Ito et al., substitutes an aromatic component taught suitable to form Ito et al.'s block copolymer for a non-aromatic component taught by Chang et al.

It is respectfully submitted that the presently claimed invention is patently distinct from the teachings of the references of record taken singly or in combination, as discussed herein below. Reversal of the rejection is respectfully solicited.

II.

Ito et al. does not teach or suggest the non-aromatic, cyclic alkenyl compound required to form the claimed invention subject to this appeal or any other component useful for oxygen scavenging. The teaching of Ito et al. does not support the rejection here on appeal.

There are several distinctions between the teachings of Ito et al. and the presently claimed invention.

Firstly, Appellants concur with the Examiner's admission that "Ito fails to disclose the claimed alicyclic, non-aromatic compound (the (a) unit for the pre-polymer (P^A)."¹ It is this element which is the key element to providing oxygen scavenging capability to the presently claimed block

copolymer and with respect to which Appellants have provided an improved product. Absence of this element clearly establishes the inappropriateness of the Ito et al. teaching with respect to the present technology and the lack of any direction to aid one to improve oxygen scavenging properties.

Ito et al. teach that the dicarboxylic acid reactant used to form their polyester elastomer should be selected from *aromatic* dicarboxylic acids and that *aliphatic* dicarboxylic acids, when used, should be limited to 3 mol percent (Ito et al. Col. 2, l. 37-43). Aromatic groups do not provide oxygen scavenging properties. Therefore, such teachings by Ito et al. to form block polymers using aromatic components confirms Appellants' position that the teachings of this cited reference is not applicable to the present invention and does not support the rejection here on appeal.

Appellants have unexpectedly found the presently claimed product to be capable of overcoming certain problems (e.g. lack of scavenger properties at refrigeration temperatures, high tack at room temperatures, difficulty to form into films using conventional apparatus) commonly associated with polymers of P^A, per se, and especially when designed to have low T_g. The remaining components of the presently claimed block copolymer provide an improved oxygen scavenging product capable of providing active scavenging properties at both ambient and refrigeration conditions and the

ability to be processed using conventional processing equipment into a tack free film.

Secondly, the film product of the presently claimed invention is distinct from that taught and/or suggested by Ito et al. The presently claimed products require a layer consisting essentially of certain defined block copolymer having non-aromatic, cycloalkenyl groups therein and a catalytic amount of a transition metal compound, complex or salt.

Ito et al clearly directs one to form films by providing *a physical mixture of a polyester resin with a polyester elastomer* (polyester block copolymer). Ito et al. teach that both of these polymers are required material components to form their film forming composition. Ito et al. goes further to instruct one (See Ito et al. Col. 2, l. 19-29) to utilize the polyester elastomer component in only low amounts, as high amounts will have detrimental effects on the formation of their film products.

In difference, the presently claimed film and laminate products have at least one layer consisting essentially of the presently defined block copolymer in combination with a transition metal catalyst. The use of the defined pre-polymers P^A and P^B to provide the resultant block copolymer can not be deemed to be a mere mixture of these components. They are

reagents used to form the desired block copolymer. Thus, the teaching of Ito et al. would not direct or suggest the presently claimed product wherein the layer consists essentially of Applicant's claimed block co-polymer.

Thirdly, Appellants' claimed invention relate to products capable of providing oxygen scavenging. Such area of technology is not taught by nor is it applicable to Ito et al.'s teaching. Ito et al. direct one skilled in the art to compositions useful to form thermoplastic, heat shrinkable films for use as labels around the outside of bottles. Such utility and its taught position on the outside of the packaging containers would not lead one skilled in the scavenging art to deem the teaching relevant to the technology useful for oxygen scavenging purposes wherein the scavenger effects the interior environ of a package.

Appellants' claims are directed to an improved oxygen scavenger composition and products formed therewith. In contrast, Ito et al. teaching does not address this area of technology nor would the components described therein have the ability to act as an oxygen scavenger material. Those artisans seeking direction in one area of technology would not look to teachings related to the other area of technology.

It is respectfully submitted that one skilled in the art of oxygen scavenger technology would not be directed to improve such technology by the teaching of Ito et al.

III.

The rejection is based on the position that the transitional phrase “consisting essentially of”, as used in the claims subject to this appeal, is equivalent to “comprising” is without merit.

The Examiner has indicated that the transitional phrase “consisting essentially of” will be construed as equivalent to “comprising” with respect to the instant application in view of the absence “of a clear indication in the specification or claims of what the basic and novel characteristics actually are.” (O.A. of 2/18/09 Item 7). The subject application clearly addresses the novel characteristic of the presently claimed invention to be film and laminate products capable of acting as an oxygen scavenger and that such property is dependent on the presence of a transition metal, as catalyst, and defined copolymers having cyclic, non-aromatic alkenyl group containing blocks in combination with other block groups and properties. Appellants teach that their claimed invention provides an improved product capable of

scavenging oxygen at both ambient and refrigeration temperature conditions and being compatible with and formed into clear, haze-free layered products useful for packaging purposes. Appellants have defined the claimed invention using terms that are well established in defining the breath of a claimed invention. Ex parte Davis 80 USPQ 448; In re Herz and Willis, 190 USPQ 461.

The Examiner states (O.A. of 2/18/09, Item 9) that it is proper to broaden the scope of the claims here on appeal to, thus, make Ito et al's teaching relevant "in the absence of any showings that the introduction of additional components would materially change the characteristics of applicant's invention." Ito et al. specifically teach that their composition must contain two types of polymeric components to form their composition. They have indicated that both their polyester resin and their polyester elastomer (their block polymer) are material to provide the properties deemed important. They further teach that the polyester elastomer must be the minor component of their composition. In difference, Appellants have used the appropriate term of patent art to establish the scope of their invention and that polyester resins of Ito et al. are not a material component, as required by the cited art.

Even if, arguendo, the polyester of Ito et al. were included, as proposed by the Examiner, Appellants have established herein above that Ito et al. is not related to an oxygen scavenger composition. The cited art does not teach or suggest (nor would it be deemed relevant by one skilled in the art of oxygen scavenging technology) of the formation of a polymeric constituent that has non-aromatic cycloalkenyl groups, as required in Appellants' claimed invention, nor any other group capable of oxygen scavenging and it clearly does not teach or suggest an improved oxygen scavenger system.

IV.

The teaching of Chang et al. is not combinable with and does not overcome the defects of the teaching of Ito et al. to make obvious the presently claimed invention subject to this appeal. The Examiner has erred in attempting to combine the teachings of Chang et al. with Ito et al.

While Ito et al. teaching is directed to a *thermoplastic* composition useful as a heat shrink label, Chang et al. is directed to *thermoset* compositions useful as an exterior automotive coating. The technologies

and the applications are not interchangeable to support the rejection here on appeal.

The Examiner recognizes that “Ito fails to disclose the claimed alicyclic, non-aromatic compound (the (a) unit for the pre-polymer P^A).” (O.A. of 2/18/09, Item 4).

The Examiner attempts to overcome the defects of Ito et al. by proposing that Chang et al.’s teaching that the aromatic compound, terephthalic acid (used by Ito et al.), and the non-aromatic compound, tetrahydrophthalic acid (or its anhydride), contained within the teachings of Chang, are “functional equivalent compounds” and, therefore, one skilled in the art “would have found it obvious to substitute tetrahydrophthalic acid (or its anhydride) for the terephthalic acid of Ito.”

It is respectfully submitted that the teachings of Chang et al. does not establish equivalency in a manner that would provide one skilled in the art the presently claimed invention nor does it suggest substitution into the teachings of Ito et al.

It is clear that the functionalities of importance in Chang et al. are the carboxylic acid and the hydroxyl groups. It must be noted that Chang et al. merely teach (Col. 4; l. 49-64) that their polyester is formed by “reacting an organic polycarboxylic acid or a functional equivalent thereof...with an

organic polyol....Diacids are preferred, although higher functional polyacids can be used.” It is clear that the functionality of importance in Chang et al. is the carboxylic acid group and *not* the organic moiety bridging the acid groups.

Chang et al. teach that *all* organic di- and polycarboxylic compounds are encompassed by their teaching to form their desired resins. Although a single cycloalkenyl dicarboxylic acid is, admittedly, in the listing of dicarboxylic acid compounds of Chang et al., it is clear that such teaching does not support the Examiner’s position of equivalency with the terephthalic acid of Ito et al. to make obvious the specific block co-polymer that is the subject of the presently claimed invention. This is especially true in view of Ito et al.’s directive to use aromatic compounds and to limit the use of any aliphatic dicarboxylic acid to less than 3 mol percent.

Further, Chang et al. is directed to the formation of distinctly different class of polymer material from that of Ito et al. The teachings would not be combined by one skilled in the art of polymer chemistry. Chang et al. is directed to a *thermosetting*, high solid content polyester-urethane composition useful as an automotive coating composition. In contrast, Ito et al. is directed to a heat-shrinkable, *thermoplastic* composition useful as film labels. It is well known in the art that thermoset and thermoplastic

compositions are distinct from each other and the teachings related to each are also distinct from the other. Those skilled in the art of polymer chemistry would not look to combine the teachings of the cited references, as proposed by the Examiner.

Still further, Chang et al. teach that all organic di- and polycarboxylic compounds are encompassed by their teaching to form their thermoset resins. Chang et al. teach that the preferred carboxylic acids are “the aliphatic ones such as hexahydrophthalic acid or its anhydride”. (Chang Col.4:l. 49-64). Such teaching would direct one to an acid having *cycloalkyl* bridging group and not to an acid having a cycloalkenyl group, as presently required nor to the aromatic acids taught by Ito et al (Ito et al. Col. 2, l. 31 et seq.).

Finally, when reading Chang et al. in its entirety, the only teaching of equivalency relates to the compounds being dicarboxylic acids. Even though terephthalic acid and tetrahydrophthalic acid are both listed by Chang et al., they are distinctly different chemically and polymers resulting there from are different chemically and physically. The Examiner has made no showing of motivating force in either reference which can be deemed to impel a person skilled in the art to do what Appellants have done. Without

such motivation, the rejection should be reversed. In re Rinehart, 189 USPQ 143; Ex parte Walker 135 USPQ 195; In re Wesslau, 147 USPQ 391, 393.

The Examiner seems to have attempted to reproduce the presently claimed invention by combining and modifying the cited art with the aid of the present application teachings. Such hindsight rejection is without merit. It is well established black letter law that hindsight reconstruction of the present invention is impermissible under 35 USC 103(a). Meng and Driessen, 181 USPQ 94; Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc. 203 USPQ 416, 419; Plastering Development Center Inc. v. Perma Glas-Mesh Corp., 179 USPQ 838; Minnesota Mining and Manufacturing Co. v. Johnson and Johnson 179 USPQ 216. A rejection under 35 USC 103(a) can not be supported by constructing the claims on review from two isolated teachings, as has been attempted here. In re Pennington, 113 USPQ 81; In re Bergel and Stock 130 USPQ 206. It is clear in the instant rejection that the references do not expressly or by implication suggest the presently claimed oxygen scavenger film or laminate product having the defined block copolymer forming one of the layers therein. Ex parte Clapp, 227 USPQ 972; In re Imperato, 179 USPQ 730.

There is no teaching in either reference to suggest to the artisan to combine their teachings to form an improved oxygen scavenger film or

laminate product, as presently claimed. The presently achieved products, having cycloalkenyl groups therein, are capable of scavenging oxygen under both ambient, room temperatures (ca. +20°C - +30°C) and refrigeration, low temperatures (ca. < +20°C to -20°C) as well as exhibit a high degree of compatibility with conventional film forming polymers to provide desired tack-free, haze-free packaging product using conventional processing equipment and still further to provide said properties without causing formation of by-products which may taint the odor, color or taste of the packaged product.

V.

The teachings of Taylor does not overcome the defects of Ito et al. and Chang et al. discussed herein above to make obvious the presently claimed invention.

The Examiner cites the teachings of Taylor specifically to support obviousness for the inclusion of a transition metal compound, complex or salt as part of the presently claimed invention. It is respectfully submitted that Taylor does not provide a teaching to support the present obviousness rejection.

Firstly, the teachings of Taylor do not address the defects noted above with respect to the teachings of Ito et al. and/or Chang et al.

Secondly, Taylor directs one skilled in the art to utilize certain transition metal salts of highly unsaturated organic acids for post-use degradation of organic polymers. One might take the position that Taylor's teaching could be optionally useful in any or all organic polymers. However, such broad interpretation would not lead one to the conclusion that the transition metal is a material component of the present oxygen scavenger composition.

The Examiner states that "Taylor discloses the formation of transition metal salt compounds which improve the degradation of polymers. The rejection here on appeal is based on the Examiner's position that it would be obvious "to include a transition metal in the film...in order to form a film which is capable of non-photochemical degradation of the polymer post consumer consumption." Such conclusion could only be done based on the teachings of the present application. The teachings of Ito et al. and Chang et al. do not teach or suggest the inclusion of a transition metal to their compositions. For example, it would not be appropriate to include an agent taught by Taylor for degradation of polymers after consumer consumption in an automotive coating composition of Chang et al. where a long term durable coating is desired (Chang et al. Col. 3, l. 20-21). Thus, the Examiner again utilizes hindsight based on the Appellants' teachings to cite

the teachings of Taylor and attempt to make a fit to define equivalence with Appellants' claimed invention. Such utilization of hindsight is without merit and can not support the present rejection. Meng and Driessen, 181 USPQ 94; Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc. 203 USPQ 416, 419; Minnesota Mining and Manufacturing Company v. Johnson and Johnson, 179 USPQ 216; In re Bergel and Stock, 130 USPQ 206.

Appellants have found that the presently claimed film and laminate products having at least one layer of the defined block co-polymer can have its oxygen scavenging properties catalyzed by the presence of a transition metal salt, compound or complex. Merely because one may achieve post consumption degradation of a polymeric film, does not suggest the need for transition metal to provide catalyzed oxygen scavenging.

VI.

The presently claimed invention is directed to block copolymers formed from pre-polymers having specifically defined properties. The Examiner's position that these properties are inherent with respect to the pre-polymers is without merit.

The Examiner has taken the position that the physical properties of the reference's polymeric material will inherently be the same as those of the

claimed block copolymer in view of the reference teaching the identical chemical structure. Appellants respectfully submit that they have shown herein above that the cited art teachings do not teach nor suggest the presently claimed films and/or laminates having at least one layer of certain defined block copolymers. Even if, arguendo, the subject copolymer was identified by name, as proposed by the Examiner, it is well known that polymers have differing physical properties in view of variations of their molecular weight, variations in amount of each group present, variations in substitution groups, etc. Thus, the physical properties presently claimed define the particular block copolymers deemed material with respect to the presently claimed invention.

Conclusion

Appellants respectfully request reversal of the Examiner's Final Rejection of Claims 1 to 5, 7 to 13, 15 and 16 of the present application and solicit a finding that the claims, as appended hereto, are patentable.

Respectfully submitted,

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Appendix

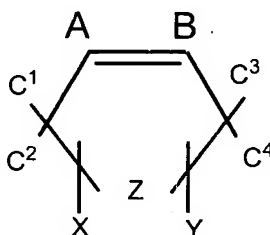
1. Claims Section

(Claims under active consideration and subject to rejection on appeal)

1. (Rejected) A film comprising at least one layer, the layer comprising an oxygen scavenger composition consisting essentially of a transition metal salt, compound or complex and a block copolymer, wherein said block copolymer comprises:

(A) at least one first prepolymer (P^A) block segment composed of mer units derived from

(a) at least one or a mixture of substituted alicyclic compounds having non-aromatic, ethylenic functionality according to the following representation:



wherein

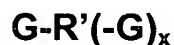
A, B, C¹, C², C³, C⁴ each independently represents hydrogen or a C_qH_{2q+1} hydrocarbyl group with q being an integer in the range of from 0 to 20, provided that either A or B and at

least one of C¹, C², C³, C⁴ are hydrogen atoms and each carbon atom of the alicyclic ring is fully substituted by groups selected from hydrogen, hydrocarbyl, X groups, Y groups and mixtures thereof;

X and Y each independently or together represents functional groups capable of being part of a heteroatom containing linkage forming a covalent bond linkage between the cycloalkenyl containing group and other mer groups forming the first polymer block segment; and

Z being selected from a -(C_tH_{2t})- hydrocarbylene group with t being an integer in the range from 1-4; and

(b) at least one or a mixture of di- or polyfunctional hydrocarbon compounds according to the following representation:



wherein

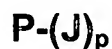
R' represents a non-aromatic or aromatic hydrocarbon group; and

each G independently represents a functional group capable of being part of a heteroatom containing linkage

between the hydrocarbon group R' and the other mer groups forming the first prepolymer block segment; and

x is at least 1; and

(B) at least one second prepolymer (P^B) block segment derived from a monofunctional or polyfunctional polymers represented by the formula



wherein

P represents a polymer capable of forming a film and being thermoplastic at temperatures higher than room temperature; and

J represents functional group capable of being part of a heteroatom containing linkage forming a covalent bond linkage between the first prepolymer (P^A) and the second prepolymer (P^B) and p is 1 or 2;

wherein at least one functional group of prepolymer (P^A) is capable of forming heteroatom containing linkage with functional group J of prepolymer (P^B), polymer block segment (P^A) is present in from 20 to 80 weight percent and polymer block segment (P^B) is present in from 80 to 20 weight percent of said block copolymer and said

prepolymer (P^A) has a T_g of lower than about minus 20°C and said prepolymer (P^B) has a T_m of higher than $+30^\circ\text{C}$.

2. (Rejected) The film of claim 1 wherein functional groups X, Y and G of said first prepolymer (P^A) are each independently selected from the group consisting of $-(\text{CH}_2)_n\text{-OH}$, $-(\text{CH}_2)_n\text{-NH}_2$, $-(\text{CH}_2)_n\text{-N=C=O}$ and $-(\text{CH}_2)_n\text{-C=O)-D}$ with n being an integer in the range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or $\text{C}_1\text{-C}_{12}$ alkyl group, or X and Y together or two G groups together represent $-((\text{CH}_2)_n\text{-C=O})_x\text{-D}$ with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2, provided that said functional groups have a molar ratio of (i) hydroxyl and amino functional groups to (ii) carboxylic acid, carboxylic acid ester, carboxylic acid halide and isocyano functional groups of from 0.9:1 to 1.1:1 and sufficient to provide residual functional groups on said first prepolymer.

3. (Rejected) The film of claim 1 wherein the (a) of prepolymer (P^A) is selected from tetrahydrophthalic acid, dimethyl tetrahydrophthalate, tetrahydrophthalic anhydride or mixtures thereof.

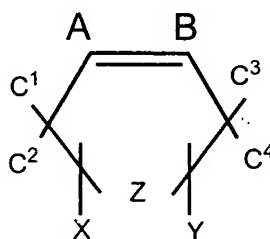
4. (Rejected) The film of claim 1 wherein (b) of prepolymer (P^A) is selected from C_2 - C_{20} alkylene glycol or poly(C_2 - C_4 alkylene) glycol.

5. (Rejected) The film of claim 1 wherein J of the second prepolymer (P^B) is selected from hydroxyl or amino groups or mixtures thereof and wherein the residual functional groups of said first prepolymer (P^A) is selected from $-(CH_2)_n-N=C=O$ and $-(CH_2)_n-C=O$ -D with n being an integer in the range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or C_1 - C_{12} alkyl group or X and Y together represent $-((CH_2)_n-C=O)_x$ -D with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2.

7. (Rejected) The film of claim 1 wherein P of the second prepolymer(P^B) is selected from C₂-C₄ polyolefins, polyesters, polystyrene, polyamide, polylactic acid, polyalkyllactone and mixtures thereof and P has a molecular weight, M_w, of at least 1000.
8. (Rejected) The film of claim 1 wherein P of the block copolymer is derived from beta-propiolactone, beta-butyrolactone, gamma valerolactone, 1,4-dioxane-2-one, 1,4-dithiane-2,5-dione, trimethylene carbonate, neopentylene carbonate, ethylene oxalate, epsilon-caprolactone, caprolactam, lactide or glycolide or mixtures thereof.
9. (Rejected) A laminated product comprising a plurality of layers, including
- i) at least one layer, the layer comprising an oxygen scavenger composition consisting essentially of a transition metal salt, compound or complex and a block copolymer, wherein said block copolymer comprises:

(A) at least one first prepolymer (P^A) block segment composed of mer units derived from

(a) at least one or a mixture of substituted alicyclic compounds having non-aromatic, ethylenic functionality according to the following representation:



wherein

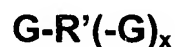
A, B, C¹, C², C³, C⁴ each independently represents hydrogen or a C_qH_{2q+1} hydrocarbyl group with q being an integer in the range of from 0 to 20, provided that either A or B and at least one of C¹, C², C³, C⁴ are hydrogen atoms and each carbon atom of the alicyclic ring is fully substituted by groups selected from hydrogen, hydrocarbyl, X groups, Y groups and mixtures thereof;

X and Y each independently or together represents functional groups capable of being part of a heteroatom

containing linkage forming a covalent bond linkage between the cycloalkenyl containing group and other mer groups forming the first polymer block segment; and

Z being selected from a $-(C_tH_{2t})-$ hydrocarbylene group with t being an integer in the range from 1-4; and

(b) at least one or a mixture of di- or polyfunctional hydrocarbon compounds according to the following representation:

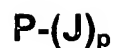


wherein

R' represents a non-aromatic or aromatic hydrocarbon group; and

each G independently represents a functional group capable of being part of a heteroatom containing linkage between the hydrocarbon group R' and the other mer groups forming the first prepolymer block segment; and x is at least 1; and

(B) at least one second prepolymer (P^B) block segment derived from a monofunctional or polyfunctional polymers represented by the formula



wherein

P represents a polymer capable of forming a film and being thermoplastic at temperatures higher than room temperature; and

J represents functional group capable of being part of a heteroatom containing linkage forming a covalent bond linkage between the first prepolymer (P^A) and the second prepolymer (P^B); and p is 1 or 2;

wherein at least one functional group of prepolymer (P^A) is capable of forming heteroatom containing linkage with functional group J of prepolymer (P^B), polymer block segment (P^A) is present in from 20 to 80 weight percent and polymer block segment (P^B) is present in from 80 to 20 weight percent of said block copolymer and said prepolymer (P^A) has a T_g of lower than about minus 20°C and said prepolymer (P^B) has a T_m of higher than +30°C.; and

ii) at least one layer comprising a material selected from the group consisting of

a) a polymeric article,

- b) a paper article, and
- c) a metal article.

10. (Rejected) The laminated product of claim 9 wherein functional groups X, Y and G of said first prepolymer (P^A) are each independently selected from the group consisting of $-(CH_2)_n-OH$, $-(CH_2)_n-NH_2$, $-(CH_2)_n-N=C=O$ and $-(CH_2)_n-C=O$ -D with n being an integer in the range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or C_1 - C_{12} alkyl group, or X and Y together or two G groups together represent $-((CH_2)_n-C=O)_x-D$ with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2, provided that said functional groups have a molar ratio of (i) hydroxyl and amino functional groups to (ii) carboxylic acid, carboxylic acid ester, carboxylic acid halide and isocyno functional groups of from 0.9:1 to 1.1:1 and sufficient to provide residual functional groups on said first prepolymer.

11. (Rejected) The laminated product of claim 9 wherein the (a) of prepolymer (P^A) is selected from tetrahydrophthalic acid, dimethyl tetrahydrophthalate, tetrahydrophthalic anhydride or mixtures thereof.

12. (Rejected) The laminated product of claim 9 wherein (b) of prepolymer (P^A) is selected from C_2 - C_{20} alkylene glycol or poly(C_2 - C_4 alkylene) glycol.
13. (Rejected) The laminated product of claim 9 wherein J of the second prepolymer (P^B) is selected from hydroxyl or amino groups or mixtures thereof and wherein the residual functional groups of said first prepolymer (P^A) is selected from $-(CH_2)_n-N=C=O$ and $-(CH_2)_n-C(=O)-D$ with n being an integer in the range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or C_1 - C_{12} alkyl group or X and Y together represent $-((CH_2)_n-C(=O))_x-D$ with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2.
15. (Rejected) The laminated product of claim 9 wherein P of the block copolymer derived from second prepolymer (P^B) is selected from C_2 - C_4 polyolefins, polyesters, polystyrene, polyamide, polylactic acid, polyalkyl lactone and mixtures thereof and P has a molecular weight, M_w , of at least 1000.

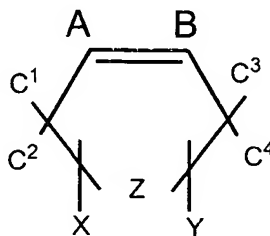
16. (Rejected) The laminated product of claim 9 wherein P of the block copolymer derived from second prepolymer (P^B) is selected from beta-propiolactone, beta-butyrolactone, gamma-valerolactone, 1,4-dioxane-2-one, 1,4-dithiane-2,5-dione, trimethylene carbonate, neopentylene carbonate, ethylene oxalate, epsilon-caprolactone, caprolactam, lactide or glycolide or mixtures thereof.

CLAIM SUPPORT

1. (Rejected) A film {Pg. 6, l. 22} comprising at least one layer, {Pg. 6, l. 24} the layer comprising an oxygen scavenger composition consisting essentially of a transition metal salt, compound or complex and a block copolymer, wherein said block copolymer {Pg. 9, l. 1-6} comprises:

(A) at least one first prepolymer (P^A) {Pg. 11, . 12-14} block segment composed of mer units derived from

(a) {Pg. 11, l. 15-22} at least one or a mixture of substituted alicyclic compounds having non-aromatic, ethylenic functionality according to the following representation:



wherein

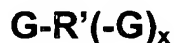
{Pg. 11, l. 23-28} A, B, C¹, C², C³, C⁴ each independently represents hydrogen or a C_qH_{2q+1} hydrocarbyl group with q

being an integer in the range of from 0 to 20, provided that either A or B and at least one of C^1 , C^2 , C^3 , C^4 are hydrogen atoms and each carbon atom of the alicyclic ring is fully substituted by groups selected from hydrogen, hydrocarbyl, X groups, Y groups and mixtures thereof;

{Pg. 12, l.1-6} X and Y each independently or together represents functional groups capable of being part of a heteroatom containing linkage forming a covalent bond linkage between the cycloalkenyl containing group and other mer groups forming the first polymer block segment; and

{Pg. 12, l.13-14} Z being selected from a $-(C_tH_{2t})-$ hydrocarbylene group with t being an integer in the range from 1-4; and

(b) {Pg. 12, l. 16-20} at least one or a mixture of di- or polyfunctional hydrocarbon compounds according to the following representation:



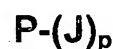
wherein

{Pg. 12, l.21} R' represents a non-aromatic or aromatic hydrocarbon group; and

{Pg. 12, l. 26-28} each G independently represents a functional group capable of being part of a heteroatom containing linkage between the hydrocarbon group R' and the other mer groups forming the first prepolymer block segment; and

{Pg. 13, l. 1} x is at least 1: and

(B) {Pg. 16, l.27 - Pg. 17, l. 6}. at least one second prepolymer (P^B) block segment derived from a monofunctional or polyfunctional polymers represented by the formula



wherein

{Pg. 17, l. 8-9}P represents a polymer capable of forming a film {Pg. 9, l. 16-26} and being thermoplastic at temperatures higher than room temperature{Pg. 17, l. 24}; and

{Pg. 17, l. 10-12} J represents functional group capable of being part of a heteroatom containing linkage forming a covalent bond linkage between the first prepolymer (P^A) and the second prepolymer (P^B) and {Pg. 17, l. 16} p is 1 or 2;

wherein at least one functional group of prepolymer (P^A) is capable of forming heteroatom containing linkage with functional group J of

prepolymer (P^B), polymer block segment (P^A) is present in from 20 to 80 weight percent {Pg. 17, l. 27} and polymer block segment (P^B) is present in from 80 to 20 weight percent {Pg. 17, l. 27} of said block copolymer and said prepolymer (P^A) has a T_g of lower than about minus 20°C {Pg. 10, 14-15} and said prepolymer (P^B) has a T_m of higher than +30°C {Pg. 9, l. 29}.

2. (Rejected) {orig. Cl. 2; Pg. 12, l. 1-12; Pg. 12, l. 29-30} The film of claim 1 wherein functional groups X, Y and G of said first prepolymer (P^A) are each independently selected from the group consisting of $-(CH_2)_n-OH$, $-(CH_2)_n-NH_2$, $-(CH_2)_n-N=C=O$ and $-(CH_2)_n-C=O)-D$ with n being an integer in the range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or C_1-C_{12} alkyl group, or X and Y together or two G groups together represent $-((CH_2)_n-C=O)_x-D$ with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2, provided that said functional groups have a molar ratio of (i) hydroxyl and amino functional groups to (ii) carboxylic acid, carboxylic acid ester, carboxylic acid halide and isocyano functional groups of from 0.9:1 to 1.1:1 and sufficient to provide

residual functional groups on said first prepolymer {Pg. 15, l. 25-30}.

3. (Rejected) {orig. Cl. 3; Pg. 13, l. 3-6} The film of claim 1 wherein the (a) of prepolymer (P^A) is selected from tetrahydrophthalic acid, dimethyl tetrahydrophthalate, tetrahydrophthalic anhydride or mixtures thereof.
4. (Rejected) {orig. Cl. 4; Pg. 14, l. 1-8} The film of claim 1 wherein (b) of prepolymer (P^A) is selected from C_2 - C_{20} alkylene glycol or poly(C_2 - C_4 alkylene) glycol.
5. (Rejected) {orig. Cl. 5} The film of claim 1 wherein J of the second prepolymer (P^B) is selected from hydroxyl or amino groups or mixtures thereof {Pg. 17, l. 13} and wherein the residual functional groups of said first prepolymer (P^A) is selected from - $(CH_2)_n-N=C=O$ and - $(CH_2)_n-C=O$ -D with n being an integer in the range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or C_1 - C_{12} alkyl group or X and Y

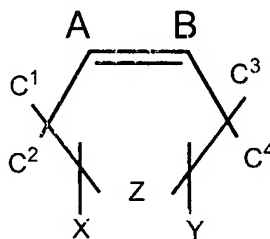
together represent $-\text{((CH}_2\text{)}_n\text{-C=O)}_x\text{-D}$ with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2 {Pg 12, l. 8-12}.

7. (Rejected) {orig. Cl. 7; Pg. 18, l. 19-27} The film of claim 1 wherein P of the second prepolymer(P^B) is selected from $C_2\text{-}C_4$ polyolefins, polyesters, polystyrene, polyamide, polylactic acid, polyalkyllactone and mixtures thereof and P has a molecular weight, M_w , of at least 1000 {Pg. 8, l.8-9}.
8. (Rejected) {orig. Cl. 8; Pg. 19, l. 15-21} The film of claim 1 wherein P of the block copolymer is derived from beta propiolactone, beta-butyrolactone, gamma valerolactone, 1,4-dioxane-2-one, 1,4-dithiane-2,5-dione, trimethylene carbonate, neopentylene carbonate, ethylene oxalate, epsilon-caprolactone, caprolactam, lactide or glycolide or mixtures thereof.
9. (Rejected) A laminated product {Pg. 10, l. 4-12} comprising a plurality of layers, including
- i) at least one layer {Pg. 6, l 24}, the layer comprising an

oxygen scavenger composition consisting essentially of a transition metal salt, compound or complex and a block copolymer, wherein said block copolymer {Pg. 9, l. 1-6} comprises:

(A) at least one first prepolymer (P^A) {Pg. 11, . 12-14} block segment composed of mer units derived from

(a) {Pg. 11, . 12-14} at least one or a mixture of substituted alicyclic compounds having non-aromatic, ethylenic functionality according to the following representation:



wherein

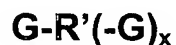
{Pg. 11, l. 23-28} A, B, C^1 , C^2 , C^3 , C^4 each independently represents hydrogen or a C_qH_{2q+1} hydrocarbyl group with q being an integer in the range of from 0 to 20, provided that either A or B and at least one of C^1 , C^2 , C^3 , C^4 are hydrogen atoms and each carbon atom of the alicyclic ring is fully substituted by

groups selected from hydrogen, hydrocarbyl, X groups, Y groups and mixtures thereof;

{Pg. 12, l.1-6} X and Y each independently or together represents functional groups capable of being part of a heteroatom containing linkage forming a covalent bond linkage between the cycloalkenyl containing group and other mer groups forming the first polymer block segment; and

{Pg. 12, l.13-14} Z being selected from a $-(C_tH_{2t})-$ hydrocarbylene group with t being an integer in the range from 1-4; and

(b) {Pg. 12, l. 16-20} at least one or a mixture of di- or polyfunctional hydrocarbon compounds according to the following representation:



wherein

{Pg. 12, l.21} R' represents a non-aromatic or aromatic hydrocarbon group; and

{Pg. 12, l. 26-28} each G independently represents a functional group capable of being part of a heteroatom containing linkage between the hydrocarbon group R' and the

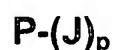
other mer groups forming the first prepolymer block segment;

and

{Pg. 13, l. 1} x is at least 1: and

(B) {Pg. 16, l.27 - Pg. 17, l. 6}.at least one second prepolymer (P^B)

block segment derived from a monofunctional or polyfunctional polymers represented by the formula



wherein

{Pg. 17, l. 8-9} P represents a polymer capable of forming a film and being thermoplastic at temperatures higher than room temperature; and

{Pg. 17, l. 10-12} J represents functional group capable of being part of a heteroatom containing linkage forming a covalent bond linkage between the first prepolymer (P^A) and the second prepolymer (P^B); and p is 1 or 2;

wherein at least one functional group of prepolymer (P^A) is capable of forming heteroatom containing linkage with functional group J of prepolymer (P^B), polymer block segment (P^A) is present in from 20 to 80 weight percent {Pg. 17, l. 27} and polymer block segment

(P^B) is present in from 80 to 20 weight percent {Pg. 17, l. 28-29} of said block copolymer and said prepolymer (P^A) has a T_g of lower than about minus 20°C {Pg. 10, 14-15} and said prepolymer (P^B) has a T_m of higher than +30°C. {Pg. 9, l. 29}; and

ii) {Pg. 21, l. 1-5} at least one layer comprising a material selected from the group consisting of

- a) a polymeric article,
- b) a paper article, and
- c) a metal article.

10. (Rejected) {orig Cl. 10; Pg. 12, l. 1-12; Pg. 12, l. 29-30} The laminated product of claim 9 wherein functional groups X, Y and G of said first prepolymer (P^A) are each independently selected from the group consisting of $-(CH_2)_n-OH$, $-(CH_2)_n-NH_2$, $-(CH_2)_n-N=C=O$ and $-(CH_2)_n-C=O-D$ with n being an integer in the range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or C₁-C₁₂ alkyl group, or X and Y together or two G groups together represent $-((CH_2)_n-C=O)_x-D$ with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2, provided that said functional groups have a molar ratio of (i)

hydroxyl and amino functional groups to (ii) carboxylic acid, carboxylic acid ester, carboxylic acid halide and isocyanate functional groups of from 0.9:1 to 1.1:1 and sufficient to provide residual functional groups on said first prepolymer {Pg. 15, l. 25-30}.

11. (Rejected) {orig. Cl. 11; Pg. 13, l. 3-6} The laminated product of claim 9 wherein the (a) of prepolymer (P^A) is selected from tetrahydrophthalic acid, dimethyl tetrahydrophthalate, tetrahydrophthalic anhydride or mixtures thereof.

12. (Rejected) {orig. Cl. 12; Pg. 14, l. 1-8} The laminated product of claim 9 wherein (b) of prepolymer (P^A) is selected from C_2 - C_{20} alkylene glycol or poly(C_2 - C_4 alkylene) glycol.

13. (Rejected) {orig. Cl. 13} The laminated product of claim 9 wherein J of the second prepolymer (P^B) is selected from hydroxyl or amino groups or mixtures thereof and wherein the residual functional groups of said first prepolymer (P^A) is selected from $-(CH_2)_n-N=C=O$ and $-(CH_2)_n-C=O$ -D with n being an integer in the

range from 0 to 20 and D being selected from a halide atom or an OR group wherein R is an -H or C₁-C₁₂ alkyl group or X and Y together represent $-\text{((CH}_2\text{)}_n\text{-C=O)}_x\text{-D}$ with n being an integer in the range from 0 to 20, D is oxygen atom and x is 2 {Pg 12, l. 8-12}.

15. (Rejected) {orig. Cl. 15; Pg. 18, l. 19-27} The laminated product of claim 9 wherein P of the block copolymer derived from second prepolymer (P^B) is selected from C₂-C₄ polyolefins, polyesters, polystyrene, polyamide, polylactic acid, polyalkyllactone and mixtures thereof and P has a molecular weight, M_w, of at least 1000 {Pg. 8, l.8-9}.

16. (Rejected) {orig. Cl. 8; Pg. 19, l. 15-21} The laminated product of claim 9 wherein P of the block copolymer derived from second prepolymer (P^B) is selected from beta-propiolactone, beta-butyrolactone, gamma-valerolactone, 1,4-dioxane-2-one, 1,4-dithiane-2,5-dione, trimethylene carbonate, neopentylene carbonate, ethylene oxalate, epsilon-caprolactone, caprolactam, lactide or glycolide or mixtures thereof.